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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/759,354	01/16/2004	Takashi Kaito	S004-5191	9905
40627	7590	06/19/2007		
ADAMS & WILKS 17 BATTERY PLACE SUITE 1231 NEW YORK, NY 10004			EXAMINER MCDONALD, RODNEY GLENN	
			ART UNIT 1753	PAPER NUMBER
			MAIL DATE 06/19/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/759,354

Applicant(s)

KAITO ET AL.

Examiner

Rodney G. McDonald

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8,31-35 and 37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8,31-35 and 37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5, 6 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamashita (U.S. Pat. 5,956,565).

Regarding claim 1, Yamashita teaches a method of cross-section processing and observation. Yamashita teaches a first step of processing at least one predetermined area in a surface of a sample to form a target cross-section. (i.e. a focused ion beam for the semiconductor device was irradiated on the cleaved surface so as to carry out sputter etching over the sectional area of the wiring). A second step of observing the target cross-section by scanning the target cross-section with a probe of a scanning probe microscope and detecting a physical quantity produced between the probe and the target cross-section. (i.e. the cross section of the semiconductor device (10) was scanned with the cantilever (16) using an AFM. Then atomic force between the semiconductor device (10) and the cantilever (16) was measured and the cross-section of the semiconductor device (10) was observed). The roughness is the physical quantity observed. (Column 5 lines 66-68; Column 6 lines 1-26; Column 2 lines 14-16)

Regarding claim 2, Yamashita teaches that in the first step the predetermined area is processed by etching the predetermined area with a focused energy beam. (Column 6 lines 9-12)

Regarding claim 3, Yamashita teaches that focused energy beam is a focused ion beam. (Column 6 lines 9-12)

Regarding claim 5, Yamashita teaches the first and second steps are carried out using a system for cross-sectional processing and observation, the system having a unit for processing the surface of the sample to expose a target cross-section thereof, and a scanning probe microscope unit for observing the target cross-section. (See Fig. 1)

Regarding claim 6, Yamashita teaches a method of cross-sectional processing an observation. Yamashita teaches a first step of processing at least one predetermined area in a surface of a sample to expose a target. (i.e. a semiconductor is cleaved to expose a side.) (Column 5 lines 66-68) A second step of sputter etching with an ion beam on the cleaved side to reduce the surface roughness of the surface in the surface of the sample.) (Column 6 lines 1-9) Then a stepped portion is formed according to differences in material from among the layers. (i.e. The layer of aluminum is sputter etched by focused ion beam etching. The aluminum etches at a faster rate than the other layers such that an unevenness is formed.) (Column 6 lines 9-17) A third step of observing the exposed cross-section with a scanning probe microscope. (i.e. the cross-section of the semiconductor device is scanned with an AFM.) (Column 6 lines 18-23)

Regarding claim 7, Yamashita teach a step of finishing the exposed cross-section into a mirror face before the stepped portion is formed. (i.e. reducing the roughness is considered to be mirror finishing) (Column 6 line 2)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita (U.S. Pat. 5,956,565) in view of Kane et al. (U.S. Pat. 6,670,717).

The difference between Yamashita and the present claims is that the first step includes a step of decomposing an organic metal gas with the focused ion beam in a predetermined location of the sample to make an electrode and an interconnect after carrying out the etching process with a focused ion beam. (Claim 4)

Regarding claim 4, the first step includes the substep including a substep of decomposing an organic metal gas with a focused ion beam in a predetermined location of the sample to make an electrode and an interconnection after carrying out the etching process with the focused ion beam. Fig. 3 shows the electrode and interconnection. (Column 5 lines 10-17; Column 8 lines 2-5; Fig. 3)

The motivation for utilizing the features of Kane et al. is that it allows for forming an electrode and interconnection. (Column 5 lines 10-17; Column 8 lines 2-5; fig. 3)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Yamashita by utilizing the features of Kane et al. because it allows for forming an electrode and interconnection.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita (U.S. Pat. 5,956,565) in view of Yang et al. (U.S. Pat. 6,207,575).

Yamashita is discussed above and all is as applies above. (See Yamashita discussed above)

The difference between Yamashita and the present claims is that repeating the step of exposing the target surface with the focused ion beam and the step of observing the exposed section with the probe being repeated sequentially is not discussed.

Yang et al. teach observing and etching repeatedly until the desired profile is achieved. (Column 6 lines 26-57)

The motivation for repeating the etching and the observing is that it allows for generation of a particular profile. (Column 6 lines 26-57)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Yamashita et al. by etching and observing repeatedly as taught by Yang et al. because it allows for generation of a particular profile.

Claims 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita (U.S. Pat. 5,956,565) in view of Hantschel et al. (U.S. Pat. 6,668,628).

Yamashita is discussed above and all is as applies above. (See Yamashita discussed above)

The difference between Yamashita and the present claims is that wherein the physical quantity measured is selected from the group consisting of an electrical conductivity, a dopant concentration, a dielectric constant, a potential, a leaking magnetic field and a spin interaction of the sample (Claim 31) and wherein the physical quantity measured is selected from the group consisting of a hardness, a friction, and an elasticoviscosity (Claim 32).

Regarding claims 31, 32, Hantschel et al. teach that a scanning probe can be used to determine topography (i.e. roughness related to friction), electrical and optical properties. (See Abstract)

The motivation for utilizing the features of Hantschel et al. is that it allows for measuring topography. (Column 3 lines 40-42)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Yamashita by utilizing the features of Hantschel et al. because it allows for measuring topography.

Claims 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita (U.S. Pat. 5,956,565) in view of Okazaki et al. (U.S. Pat. 6,437,343).

Yamashita is discussed above and all is as applies above. (See Yamashita discussed above)

The differences between Yamashita and the present claims is that utilizing a microscope unit to observe the position of the probe is not discussed (claim 33) and the microscope unit comprising an optical microscope is not discussed (claim 34).

Regarding claims 33, 34, Okazaki et al. teach utilizing an optical microscope to observe the position of the probe. (Column 18 lines 4-22)

The motivation for utilizing an optical microscope is that it allows for observing the position of the probe. (Column 18 lines 4-22)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Yamashita by utilizing the features of Okazaki et al. because it allows for observing the position of the probe.

Claims 33 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita (U.S. Pat. 5,956,565) in view of Hitachi (Japan 10-223170).

Yamashita is discussed above and all is as applies above. (See Yamashita discussed above)

The differences between Yamashita and the present claims are that utilizing a microscope unit to observe the position of the probe (Claim 33) and the microscope unit comprising a SEM (Claim 35).

Hitachi teaches utilizing an SEM to determine the position of the probe. (See Abstract)

The motivation for utilizing a SEM is that it allows for observing the position of the probe. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Yamashita by utilizing a SEM as taught by Hitachi because it allows for observing the position of the probe.

Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita (U.S. Pat. 5,956,565) in view of Azuma et al. (U.S. Pat. 5,683,547).

The difference not yet discussed is where the mirror finishing is conducted by irradiating an electron beam in parallel with blowing of an etching gas.

Azuma et al. teach irradiating an electron beam on a sample in an etching gas atmosphere. (See Abstract) The nozzle of Fig. 1. causes the blowing of the etching gas in parallel with the electron beam. (See Fig. 1) It is mirror finished because the surface is flat. (See Fig. 24a-24c)

The motivation for utilizing an electron beam with an etching gas is that it allows for local etching. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have irradiated an electron beam in parallel with blowing of an etching gas as taught by Azuma et al. because it allows for local etching.

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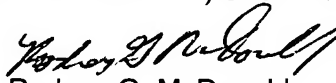
REMARKS:

In response to the argument that the prior art does not teach cross-sectional processing and observation, it is argued that newly cited reference to Yamashita teach cross-sectional processing and observation. The substrate is cleaved and the substrate is etched and observed. (See Yamashita Column 5 lines 66-68; Column 6 lines 1-26)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M-TH with every Friday off..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Rodney G. McDonald
Primary Examiner
Art Unit 1753

RM
June 12, 2007